

Work Order ID 116463

April-16-14 11:01:00 AM

\*116463\*

Page 1

Item ID: D407-667-205

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Aft Crosstube

Start Date: 4/16/14 Start Qty: 1.00 \*1\*

Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00 \*1\*

Customer:

Reference:

Approvals: Process Plan: MLS Date: 14-04-16

Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_

SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
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D407-667-245	Rev F/DEO
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100	Document Control	0.00							
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\*100\*

DC

DOCUMENT CONTROL

Memo

0.00

Doc.Control -USB or Paperwork

Photocopy bluefile and create labels as per PPP D407-667-205 CHG008

DAS  
28  
9-89

MAY 14 2014

110	Pick Kit	0.00							
-----	----------	------	--	--	--	--	--	--	--

\*110\*

Packaging

Packaging

Memo

0.00

Packaging

BC AW 14/04/21

120		0.00							
-----	--	------	--	--	--	--	--	--	--

\*120\*

CNC Bend 1

BENDING MACHINE - CROSSTUBES

Memo

0.00

CNC Delta 100 Bender

1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21

AW 14-04-21

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop \*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID Tool # Plan Code Accept Qty Reject Qty Reject Number Insp. Stamp

130

QC15- Crosstube Dimensional Check

0.00

\*130\*

QC

Memo

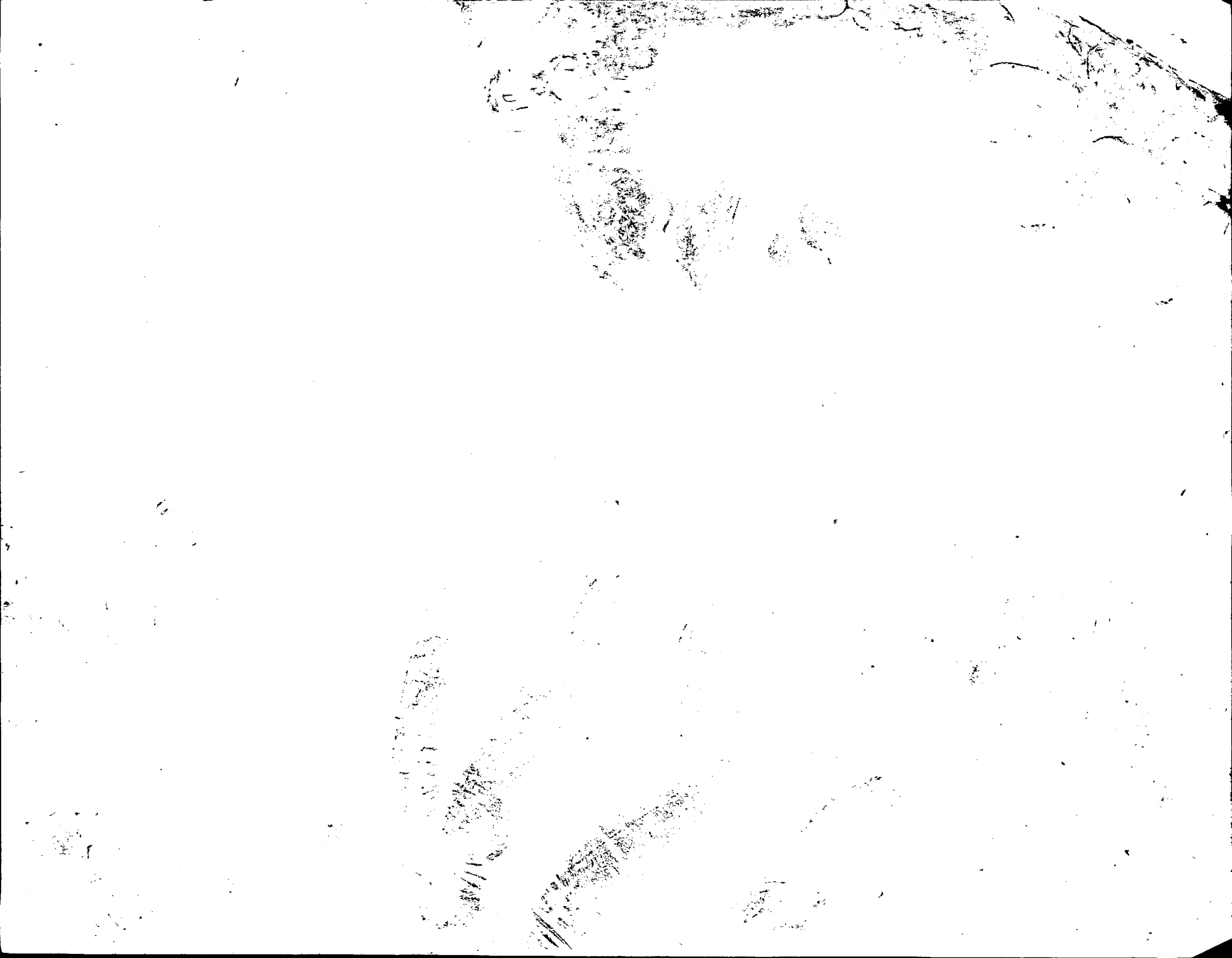
0.00

Quality Control

DAS  
03  
9-89

DP

14-4-22



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Item ID: D407-667-205

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Start Date: 4/16/14 Start Qty: 1.00

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Reference:

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Setup Start \*NS1\*

Stop \*NS2\*

Cust Item ID:

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start \*NR1\*

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

140

\*140\*

Crosstubes

Crosstubes

0.00

0.00

Memo

\*\*\*\*\* ENSURE PROPER JIG POSITIONING BEFORE DRILLING\*\*\*\*\*  
VERIFIED BY: AW \*\*\*\*\*

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes. Holes facing inboard. Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

\*\*\*\*\* ENSURE PROPER JIG POSITIONING BEFORE DRILLING\*\*\*\*\*  
VERIFIED BY: AW \*\*\*\*\*

2- Drill fwd rivet holes using drill Jig DT8787 fwd as per Dwg D407-667-245.  
Note: FWD side has 3X top holes facing inboard.

3- C'sink holes as per dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

4- Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins. Drill ONLY 2 top holes ONLY plug most bottom hole to prevent accidental drilling. Drill holes and ream using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes. Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

\*\*\*\*\* ENSURE PROPER JIG POSITIONING BEFORE DRILLING\*\*\*\*\*  
VERIFIED BY: AW \*\*\*\*\*

5-Drill aft rivet holes using drill Jig DT8787 aft as per Dwg D407-667-245.

BL / AW 14-04-14



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Revision ID:

Item Name: Aft Crosstube

Stop \*NS2\*

Start Date: 4/16/14 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop \*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Drill only the top (2) holes.

\*\*\*\*\* ENSURE PROPER JIG POSITIONING BEFORE DRILLING\*\*\*\*\*  
VERIFIED BY: AW \*\*\*\*\*

6- C'sink holes as per dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

7- Scribe tube to identify on the inner chamfer in the cuff D# and B#

8-\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\* Deburr  
& Inspect for surface damage. Repair damage within limits as per Dwg D407-667-245

QC5- Inspect part completeness to step on W/O

0.00

0.00

Memo

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

DAS  
27

9-89

14/4/28

BL/2 14-04-24

BL/2 14-04-28

150

\*150\*

QC

Quality Control

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Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00

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Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160		0.00							
<b>*160*</b>						1	0	0	14-4-29
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- CLEAN CROSSTUBE WITH WASH'N WIPE								
180	Outsource process - NDT per QSI038 4.1	0.00							
<b>*180*</b>									
Outsource2	Memo	0.00							
Outsource process - NDT	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Liquid Penetrant Inspection as per QSI 0380								
	Issue P/O: 23989 LPI as per ASTM 1417								
	Level 2 Attach copy of NDT results to work order								
190		0.00							
<b>*190*</b>									
Packaging	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Ensure copy of NDT results attached to work order.								

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**\*1\***

Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	QC5- Inspect part completeness to step on W/O	0.00	DAS	27					
<b>*200*</b>			1-89						
QC	Memo	0.00	14/4/29						
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
204		0.00							
<b>*204*</b>									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION								
206	QC7-Inspect Chemical Conversion Coat	0.00							
<b>*206*</b>									
QC	Memo	0.00	5th						
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***		14/5/11						

BL/TW 14-04-29



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**\*N900040100\***Setup Start **\*NS1\***

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Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
<b>*210*</b>									
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	***Mask underside of crosstube as shown***								
	1-Prime inside and outside crosstube as per DEO D407-667-245 and QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME: 124403								
	Start Time: 8:00								
	Finish Time: 8:30								
	PAINT: m128574								
	Start Time: 3:00								
	Finish Time: 3:30								
220	QC14- Inspect Spray Paint	0.00							
<b>*220*</b>									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								




# Non-Conformance Report

<b>Reviewed</b>
<b>DQA:</b>
<b>Date:</b>

Printed on: Friday, May 02, 2014

<b>Details</b>			
<b>Raised Date</b> 5/2/2014	<b>Status</b> Open	<b>Owner</b> Forbes, Nigel	<b>Number</b> NCR14-3817
<b>Target Date</b> 5/19/2014	<b>Standard</b>	<b>Severity</b> MAJOR	
<b>Process</b> Employee Suggestion		<b>Audit</b>	
<b>Raised By Person</b> Downing, Eric M	<b>Raised Against (Department or Supplier)</b> Manufacturing	<b>Fault Category</b> General\BOM/Route	
<b>Details</b> was noticed by painter that he did not mask center strip in D407-667-205 inspection window on qty x 4 cross tubes B116464, B116463, B112864, B116461			
<b>Keywords</b> inspection window		<b>Product</b> D206-667\D407-667-205	
<b>Document</b>		<b>Root Cause</b>	
<b>Closed By</b>	<b>Closed Date</b>	<b>Resolution</b>	

<b>Corrective Action</b>			
<b>Target Date</b> 5/19/2014	<b>Owner</b> Downing, Eric M	<b>Closed Date</b>	<b>Closed By</b>
<b>Details</b>			

<b>Actions</b>			
<b>Number</b>	<b>Owner</b>	<b>Target Date</b>	<b>Completed Date</b>
<b>Details</b>		<b>Response</b>	
1	White, Jesse	5/9/2014	
using a line mate grinder buff longitudinally the paint & primer on the inside bend of the cross tube as specified in the drawing		JW	14-05-04
2	<del>Murdoch, Matthew</del>	5/9/2014	
<del>scuff / sand paint lightly to help blend in</del> strip tube		AS	14-5-4
3	Murdoch, Matthew	5/9/2014	
re alodine area as per QSI 005			

4	Murdoch, Matthew	5/9/2014	
re prime as per Dwg & per QSI 005		128836	AP 14-5-9
5	Murdoch, Matthew	5/9/2014	
per paint per Dwg & QSI 005 and re clear coat		128764	14-5-9 CR 14-05-10
6	Duval, David	5/16/2014	
update all cross tube work orders to have priming & painting as two different steps			

### Verification & Review

Target Date	Owner	Closed Date	Closed By
Details			

### Actions

Number	Owner	Target Date	Completed Date
Details		Response	

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Item ID: D407-667-205

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Aft Crosstube

Start Date: 4/16/14 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_

Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_

SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

230

0.00

**\*230\***

Crosstubes

0.00

Crosstubes

Memo

1- Install chafing shield as per DEO D407-667-245. Top holes should be facing up.

A/R Proseal 890 Batch: 128712  
EXP: 10/14

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D407-667-245 using installation jig DT9025. Torque clamps as per dwg

A/R Scotch-Weld DP460 Batch: M128180  
EXP: 15103

\*\*\*LET CURE FOR 24 HOURS\*\*\*

CURE TIME:

START: 9:30 14-5-12FINISH: 10:30 14-5-13

4- Install nut plates as per Dwg D407-667-245. Touch up rivet heads with Imron paint.

1 CR 14-05-12

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Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

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Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

240	QC5- Inspect part completeness to step on W/O	0.00							
<b>*240*</b>									
QC	Memo	0.00							
Quality Control	***RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURE FOR 24HOURS AS PER DWG DEO***								

250	Pick Kit	0.00							
<b>*250*</b>									
Packaging	Memo	0.00							
Packaging									

DAS  
32  
9-89

14/5/14 QD

260	QC4- 100% Inspect kits for completeness	0.00							
<b>*260*</b>									
QC	Memo	0.00							
Quality Control									

DAS  
06  
9-89

1X

DAS  
28  
9-89

MAY 14 2014

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Run Start \*NR1\*

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Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							MAY 15 2014
<b>*270*</b>	Packaging					1X			
Packaging	Memo	0.00					DAS 28 9-89	DAS 06 9-89	
Packaging	Identify and in kanban rack Location: <u>113</u>								
280	QC21- Final Inspection - Work Order Release	0.00							
<b>*280*</b>									
QC	Memo	0.00							
Quality Control									

14/5/15

14-5-15

# Picklist Print

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Work Order ID: 116463

**\*116463\***

Parent Item: D407-667-205

**\*D407-667-205\***

Parent Item Name: Aft Crosstube

Start Date: 4/16/14

Required Date: 5/01/14

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell SkidtubesKJ/JLM  
IPP Rev:D Added Magnobond,Rubber Cushion & Clamps 07-02-19  
JLM

\*\*\*\*CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER\*\*\*\*

IPP Rev:E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified by:EC

IPP Rev:F 08-06-12 add comment in seq. 24 DD verified by:EC

IPP Rev:G 08-08-19 revE as per dwg DD verified by:EC

IPP Rev H 09.01.06 ECN 08-562 EC verified by:DD IPP Rev:I

10.04.07 revise route seq. in bom DD verified by:JLM IPP Rev J 11.04.26

removed abrasion strip ecn 11-551 EC verified

by:DD

IPP REV:K

11.10.03 DEO D407-667-245-F-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN		Manufactured	No			110	Each	10.0000	1	1			

**\*D407-667-205TRN\***

**\*\***

Crosstube Turning Detail

Location	Loc Qty	Loc Code
LG	3	
105222	1	
115331	1	
115363	1	
LG014	7	
105224	1	
105225	1	
108604	1	
108606	1	
108607	1	
115332	1	
115334	1	

1

W 14-04-21



**Picklist Print**

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Parent Item Name: Aft Crosstube

Start Date: 4/16/14

Required Date: 5/01/14

Start Qty: 1.00

Required Qty: 1.00

D2873-043

Manufactured No

230

Each

116.0000

2

2

**\*D2873-043\***

Nut Plate Assembly

**\*\***

CR 14-05-01

LocationLoc QtyLoc Code

LG052

116

104871

1

107964

10

112264

25

113050

40

114550

40

2

D2873-045

Manufactured No

230

Each

119.0000

2

2

**\*D2873-045\***

Nut Plate Assembly

**\*\***

CR 14-05-01

LocationLoc QtyLoc Code

LG

34

112430

34

LG052

85

108829

5

113144

40

113886

40

2

D2894-1

Manufactured No

230

Each

18.0000

1

1

**\*D2894-1\***

2.75 Support

**\*\***

CR 14-05-12

LocationLoc QtyLoc Code

LG052

18

103950

2

105623

6

113132

10

1

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Shop Packet Print

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Start Date: 4/16/14

Required Date: 5/01/14

Start Qty: 1.00

Required Qty: 1.00

D3190-1

Manufactured No

230

Each

43.0000

2

2

**\*D3190-1\***

Chaffing Shield

\*\*

CR 14-05-12

Location

Loc Qty

Loc Code

LG053

43

105834

29

109948

14

2

D3595-063-450

Manufactured No

230

Each

85.0000

2

2

**\*D3595-063-450\***

Rubber Cushion

\*\*

CR 14-05-12

Location

Loc Qty

Loc Code

FG

15

88422

5

94274

10

LG

15

111538

15

LG051

55

109526

2

113323

28

115271

25

2

MS20601-AD4W8

Purchased No

230

Each

653.0000

14

14

**\*MS20601-AD4W8\***

RIVET

\*\*

CR 14-05-01

Location

Loc Qty

Loc Code

ST311

653

M126637

24

M127813

129

M128429

200

M128650

300

14

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Shop Packet Print

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Start Date: 4/16/14

Required Date: 5/01/14

Start Qty: 1.00

Required Qty: 1.00

MS21920-22 Purchased No 230 Each 307.0000 4 4

**\*MS21920-22\***

Clamp

\*\*

CR 14-05-12

Location	Loc Qty	Loc Code
LG	200	
M128636	200	
LG050	107	
M127255	40	
M127608	19	
M128199	48	4

MS21920-25 Purchased No 230 Each 86.0000 2 2

**\*MS21920-25\***

Clamp

\*\*

CR 14-05-12

Location	Loc Qty	Loc Code
FG	2	2
120920	2	
LG050	84	
M127823	25	
M128012	9	
M1285701	25	
M128718	25	

NAS1149D0563J Purchased No 230 Each 4,532.000 18 18

**\*NAS1149D0563.J\***

Washer

\*\*

DAS  
32  
9-89

14/8/14

DAS  
28  
9-89

Location	Loc Qty	Loc Code
GA	201	
m125807	201	
ST510a	4331	
m126319	2331	
m128257	2000	

7/126319

April-16-14 11:01:06 AM

Shop Packet Print

Page 4

# Picklist Print

April-16-14 11:01:06 AM

Page 5

Work Order ID: 116463

**\*116463\***

Parent Item: D407-667-205

**\*D407-667-205\***

Parent Item Name: Aft Crosstube

Start Date: 4/16/14

Required Date: 5/01/14

Start Qty: 1.00

Required Qty: 1.00

AN5-10A

Purchased

No

250

Each

674.0000

10

10

**\*AN5-10A\***

BOLT

**\*\***

DAS  
32  
9-89

DAS  
28  
9-89

Location

Loc Qty

Loc Code

GA	101
122800	101
ST362	366
M127432	66
M128634	300
st503	207
M126180	207

M128634

AN5-32A

Purchased

No

250

Each

446.0000

4

4

**\*AN5-32A\***

Bolt

**\*\***

DAS  
32  
9-89

14/0/14

DAS  
28  
9-89

Location

Loc Qty

Loc Code

ST337	114
124215	110
m127363	4
st503	182
m127550	30
m128403	152
ST504	150
m128634	150

M128403

# Picklist Print

April-16-14 11:01:06 AM

Page 6

Work Order ID: 116463

**\*116463\***

Parent Item: D407-667-205

**\*D407-667-205\***

Parent Item Name: Aft Crosstube

Start Date: 4/16/14

Required Date: 5/01/14

Start Qty: 1.00

Required Qty: 1.00

AN5-34A

Purchased

No

250

Each

206.0000

4

4

**\*AN5-34A\***

Bolt

**\*\***

DAS  
32  
9-89

DAS  
28  
9-89

Location

Loc Qty

Loc Code

ST338

106

m126176

6

m127817

14

m127933

36

m128403

50

st503

100

m128634

100

M127933

MS21042L5

Purchased

No

250

Each

1,603.000

4

4

**\*MS21042L5\***

Nut

**\*\***

DAS  
32  
9-89

DAS  
28  
9-89

Location

Loc Qty

Loc Code

GA

5

117611

5

ST315

98

m127304

98

ST509

1500

m127813

500

m128810

1000

14/01/14 ①

M128810

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

Work Order: _____  Part No. _____  NCR No. _____	<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Suspected Unapproved <input type="checkbox"/>	<b>AGAINST DEPARTMENT/PROCESS</b>  <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	
Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>															
Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>																

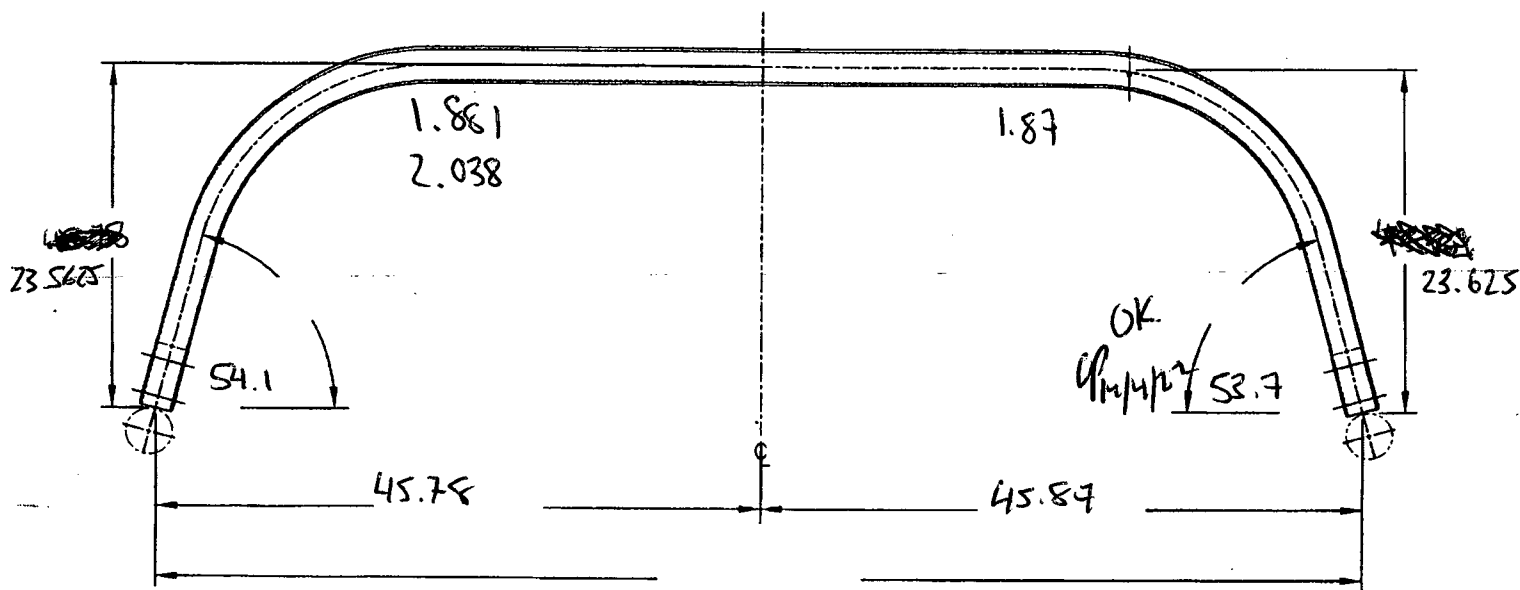
Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

### FAULT CATEGORY

<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric <input type="checkbox"/> Cracks <input type="checkbox"/> Crimp/Kink/Ripple/Wave <input type="checkbox"/> Cuffs <input type="checkbox"/> Crushing <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Marks/Chatter <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damage/Defect <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drawing <input type="checkbox"/> Drill Holes <input type="checkbox"/> Finish <input type="checkbox"/> Fit/Function	<input type="checkbox"/> Folio/Program <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete/Unqualified <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Misaligned/off center <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Off-set <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence	<input type="checkbox"/> Outside Dimensions <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Set-up <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other
--	--	---	--

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	<b>116463</b>
<b>Description:</b> Crosstube High Aft (407)	<b>Part Number:</b>	<b>D407-667-205</b>
<b>Inspection Dwg:</b> D407-667-245      . Rev: F		<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	23.39	23.65
1/2 Span	45.79	46.05
Angle	54	56
Total Span	91.58	92.100
Bending Passes	6	--
Crushing	--	6%



	Side A	Side B
<b>Bending Passes</b>	33	28
<b>Crushing</b>	4%	4.4%
<b>Comments</b>		

<b>QC15 Inspection</b>	<b>DAS</b> <b>03</b> <b>9-88</b>
<b>Date</b>	<b>14-4-22</b>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	
C	11.08.22	Dimensions updated	KJ	
D	11.09.30	Dimensions updated	KJ	
E	12.04.16	Added bending, crushing dimensions	KJ	

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6011-115  
FINISHED LENGTH = 112.91±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON  
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO  
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND  
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO  
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE  
SUPPORT.  
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.  
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF  
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE  
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN  
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

116463 MLS  
14-04-16

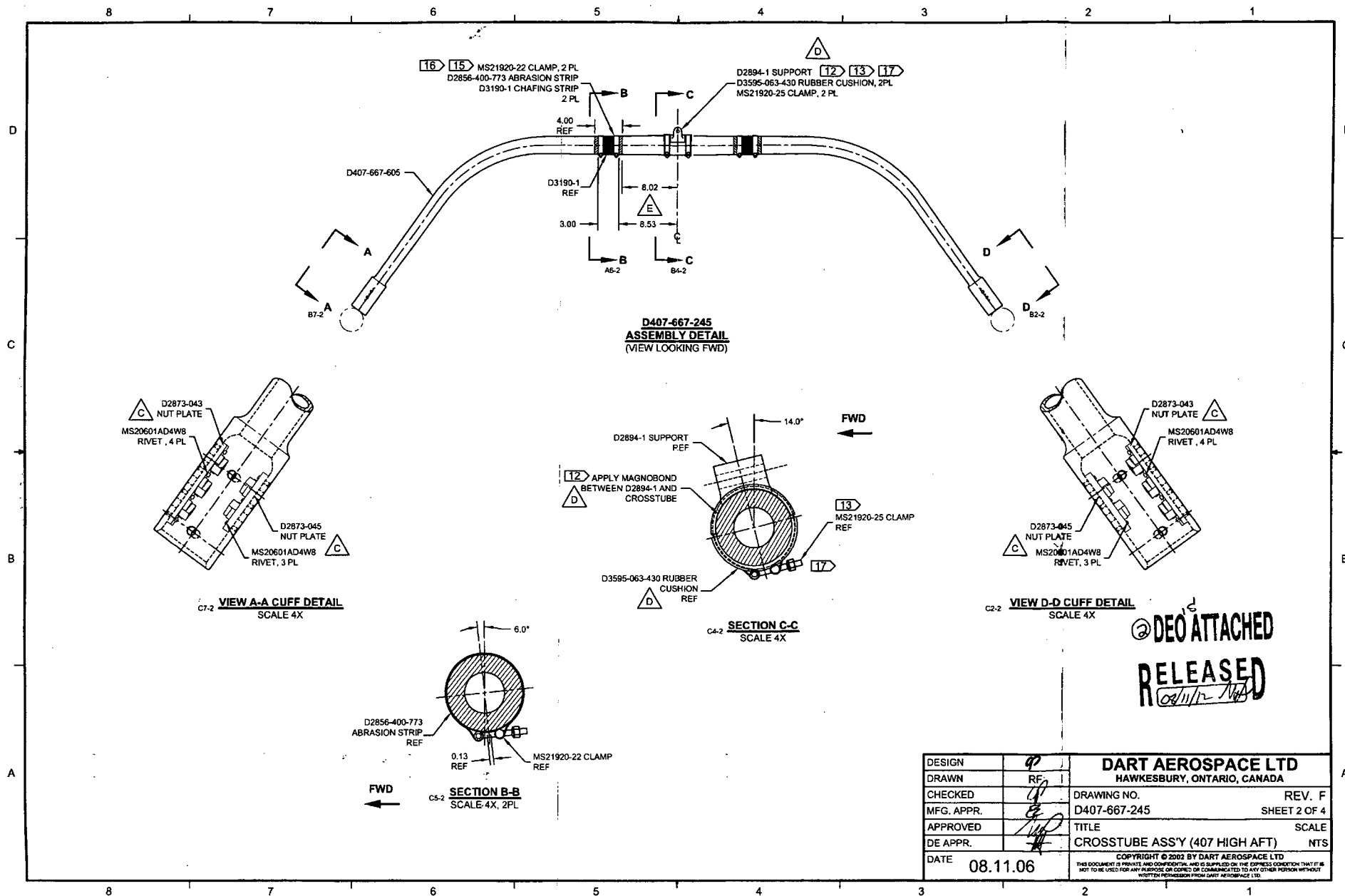
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08/11/12

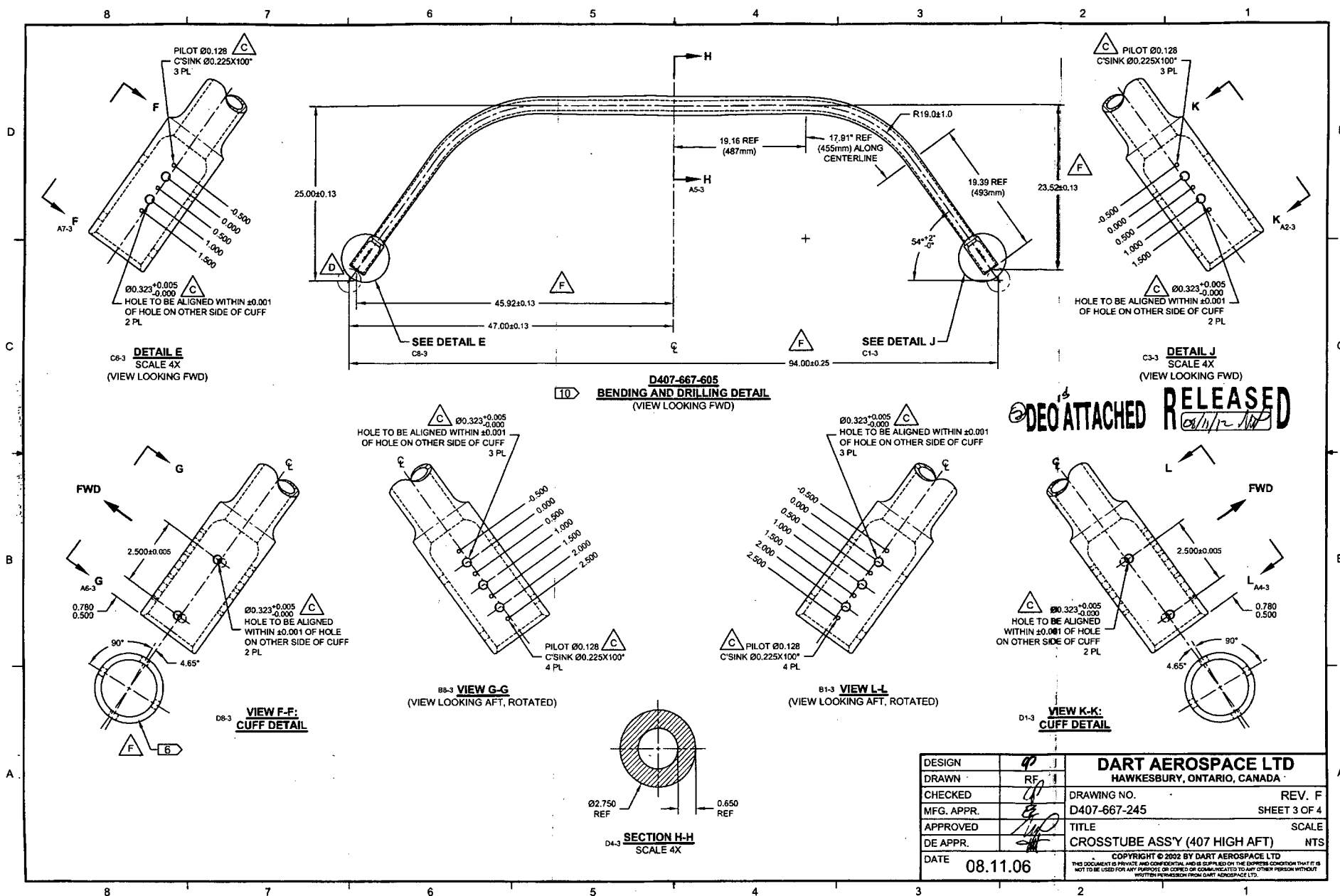
F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	90		
DRAWN	RF		
CHECKED	90		
MFG. APPR.	90		
APPROVED	90		
DE APPR.	90		
DATE	08.11.06		

<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D407-667-245	REV. F SHEET 1 OF 4
TITLE CROSSTUBE ASSY (407 HIGH AFT)	SCALE NTS
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RELEASED  
08/11/06

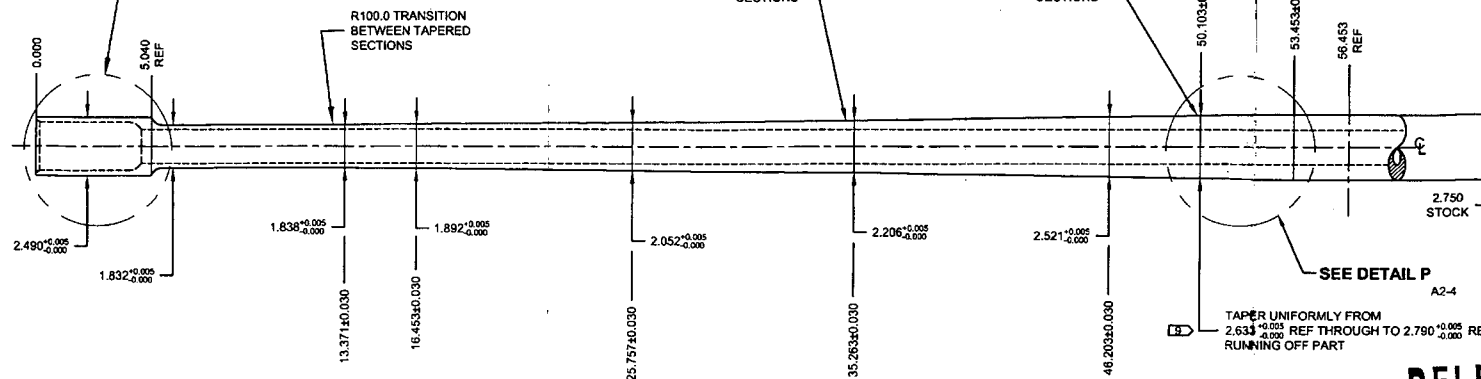


# D407-667-245 MACHINING DETAIL

RELEASED  
08/11/12

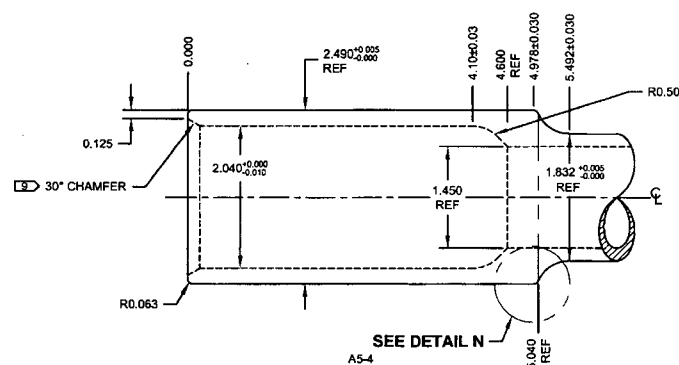
DEO ATTACHED

SEE DETAIL M  
A7-4

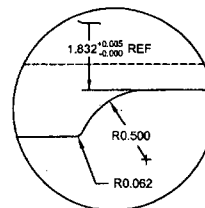


SEE DETAIL P  
A2-4

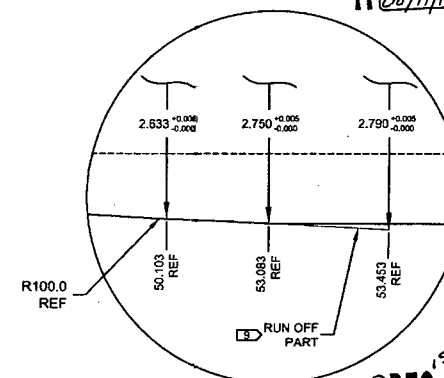
TAPER UNIFORMLY FROM  
2.633 +0.005/-0.005 REF THROUGH TO 2.790 +0.005/-0.005 REF  
RUNNING OFF PART



D8-4 **DETAIL M: CROSSTUBE CUFF**  
SCALE 3X



D6-4 **DETAIL N: CUFF TRANSITION**  
SCALE 2X



C1-4 **DETAIL P: TAPER RUN-OFF**  
NOT TO SCALE

DESIGN	9	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	CP	DRAWING NO.	REV. F
MFG. APPR.	SE	D407-667-245	SHEET 4 OF 4
APPROVED	HA	TITLE	SCALE
DE APPR.	HA	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	<small>COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN <i>[Signature]</i>	CHECKED <i>[Signature]</i>	MFG. APPR. <i>[Signature]</i>	APPROVED <i>[Signature]</i>		DE APPR. <i>[Signature]</i>		
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12		DATE 11.04.12		

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

Item	Qty -245	Part Number	Description
3	0	D2856-400-773	ABRASION STRIP

**WAS:**

3	2	D2856-400-773	ABRASION STRIP
---	---	---------------	----------------

NOTES 2 AND 15, SHEET 1 ARE AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND  
PAINT OUTSIDE PER DART QSI 005 4.2  
REMOVE MASKING AND APPLY CLEAR COAT
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1  
CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL  
PROSEALED D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT  
OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF  
CROSSTUBE PER QSI 035.

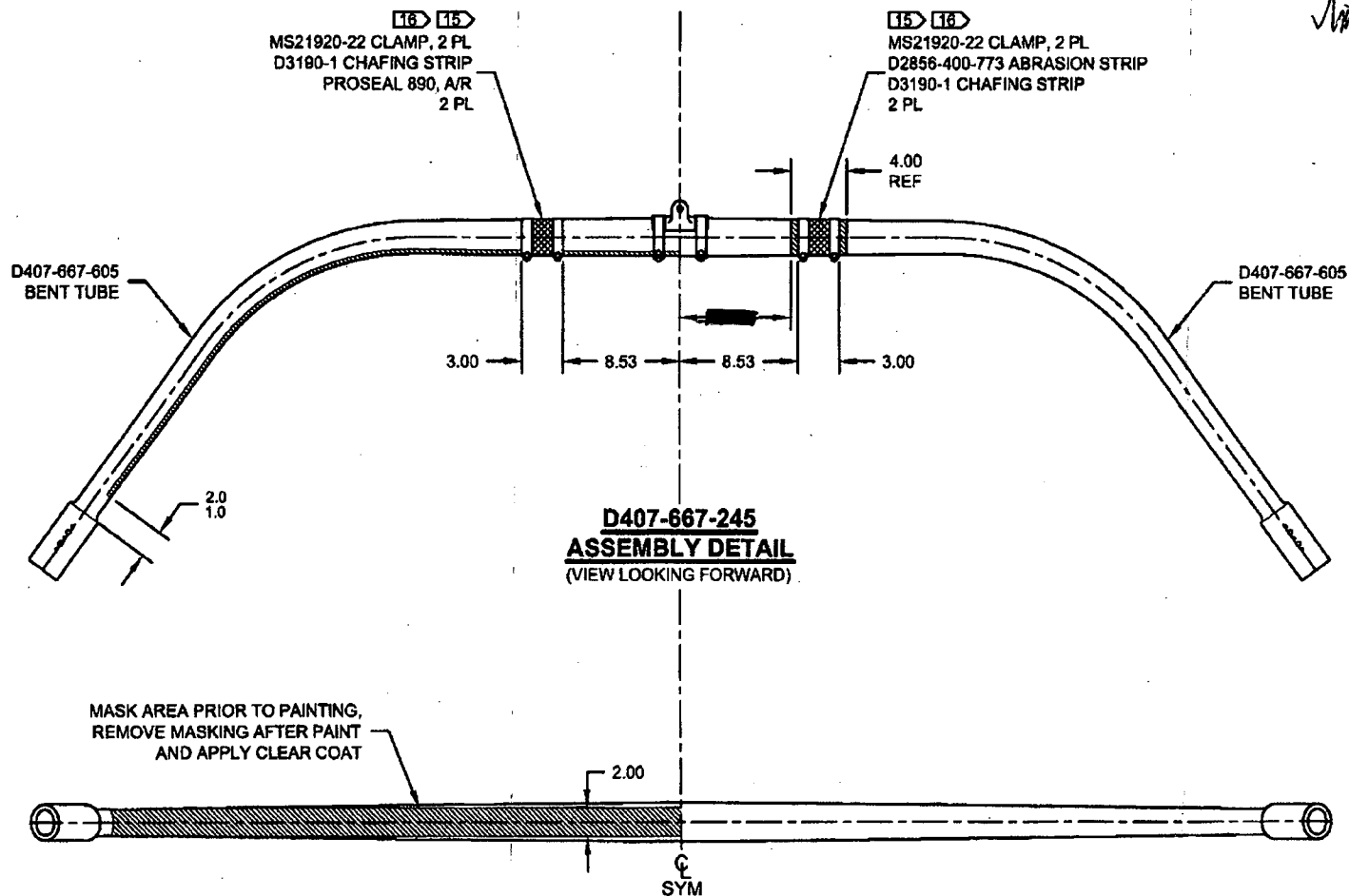
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2011-04-18  
*[Signature]*

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>UP</i>	MFG. APPR. <i>E</i>	APPROVED <i>UP</i>	DE APPR. <i>H</i>		
DATE 11.04.08	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

IS:

WAS:

**RELEASED**  
2011-04-18  
*W*



**skyservice****Work Order Traveler**  
Sky Service F.B.O. Inc.

Page: 1 of 1

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO20715	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 23989
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN: 0	CSN: 0	TSO: 0	

Task: <b>UNSCHEDULED</b>	Sequence: 1
--------------------------	-------------

**Work Required:****CARRY OUT NDT INSPECTION (LIQUID PENETRANT) ON 5 CROSSTUBES**

ITEM ID: D407-667-205 AFT CROSSTUBE

- 1 - WORK ORDER ID#: 116463
- 2 - WORK ORDER ID#: 116461
- 3 - WORK ORDER ID#: 112865
- 4 - WORK ORDER ID#: 112864
- 5 - WORK ORDER ID#: 116464

DAS  
27  
9-89  
14/4/29

<b>Action Taken:</b>						Date:	Initial/Stamp:
LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-5) AS PER ASTM1417M-13						APR 29 2014	
NO CRACK FOUND							
Pen: ZL-56 BATCH# 09H094 EXP. DATE: AUG 2014, DEV: SKD-S2 EXP. DATE: OCT2017 CLEANER: SKC-S EXP. DATE: APR 2018							
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp DOT APP 177 53-89	Date:
Name: <b>ANTONINO MARCHETTA</b>		APR 29 2014



# Work Order ID 116463

\*116463\*

April-16-14 11:01:00 AM

Item ID: D407-667-205

Accept

\*N9000040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Aft Crosstube

Start Date: 4/16/14 Start Qty: 1.00 \*1\*

Cust Item ID:

Required Date: 5/01/14 Req'd Qty: 1.00 \*1\*

Customer:

Reference:

Run Start \*NR1\*

Approvals: Process Plan: MLJ Date: 14-04-16 Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop \*NR2\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
<b>Draw Nbr</b>	<b>Revision Nbr</b>								
D407-667-245	Rev F/DEO								
100	Document Control	0.00							
<b>*100*</b>	DOCUMENT CONTROL								
DC	Memo	0.00							
Doc.Control -USB or Paperwork	Photocopy bluefile and create labels as per PPP D407-667-205 CHG008								
110	Pick Kit	0.00							
<b>*110*</b>	Packaging								
Packaging	Memo	0.00							
Packaging									
120		0.00							
<b>*120*</b>	BENDING MACHINE - CROSSTUBES								
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	1-Bend tube as per Dwg D407-667-245 using CNC bender program 407.21								
	Folio 21								

MLJ 14-05-14

BC 14/04/21